

Remarks

The Applicant appreciates the Examiner's consideration of the two references submitted with Amendment A on the Supplemental Information Disclosure Statement.

The current Office Action rejects claims 15-24 as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. In response to the rejection, the Applicant has chosen to remove the offending language from claim 15. The Applicant submits the language was in a "whereby" clause that was intended to express the intended result of the recited method step. The Applicant understands such "whereby" clauses are not given patentable weight and are not used to define the metes and bounds of the invention. See MPEP 2111.04. Although the Applicant submits the whereby clause added to the understanding of the intended result of the method step, the removal does not change the scope of the claim 15 and does not change the positively-recited steps of the claim.

The current Office Action rejects claim 18 contending that the recitation of "the unique set of pitch sizes" on line 3 does not have the proper antecedent basis. The Applicant respectfully traverses the rejection. The "unique set of pitch sizes" recitation is first introduced in claim 17. The Applicant thus submits the recitations of claim 18 have the proper antecedent basis.

The current Office Action rejects claim 21 for missing an essential element. The Applicant has amended claim 21 and submits the amended claim overcomes the rejection.

Rejections based on 35 U.S.C. § 103(a)

Claims 1-14

The Office Action rejects claims 1-2, 6, and 11 as being obvious over Sekula in view of Kogure. The Office Action also rejects claims 3-5, 7-10, and 12-14 as being obvious over the Sekula/Kogure combination in further view of Stuckey. The Applicant respectfully traverses these rejections. Each of these claims is based on the method recited in independent claim 1 which requires the modulation orders to be selected and defined prior to the development of the pitch sequence. The Applicant submits the combination of Sekula with Kogure fails to disclose, teach, or suggest this method. Further, the Applicant submits both references teach away from the claimed solution. As such, the Applicant submits the Office Action has not established a prima facie of obviousness with respect to independent claim 1 or any of its dependent claims.

Turning to the Graham analysis, the Applicant notes that in determining obviousness, one must (1) determine the scope and content of the prior art; (2) ascertain the differences between the prior art and the claimed invention; and (3) resolve the level of ordinary skill in the pertinent art. *Graham v. John Deere Co.*, 383 U.S. 1, 17 18, 148 USPQ 459, 467 (1966). Secondary considerations such as commercial success, long felt but unsolved need, and failure of others are also considered. *Id.* Thus, one first looks to the content of the Sekula and Kogure references and then identifies the differences between their content and the claimed invention. The determination of obviousness is made against this

background. The Office bears the burden of establishing a *prima facie* case of obviousness. The teaching, suggestion, motivation analysis provides a helpful insight to whether or not an invention is obvious in view of the combination of other references. The MPEP sets forth that to establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestions or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. The teaching or suggestions to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and not based on applicant's disclosure. M.P.E.P. § 2142. Further, a patent composed of several elements (or steps) is not proved obvious merely by demonstrating that each element was, independently, known in the prior art.

Sekula discloses a method for defining a tire noise pitch sequence from target audio spectrum such as a white noise spectrum. Sekula performs an inverse Fourier transform of a single period of the target audio spectrum, adjusts the result to define a period proportional to the circumference of the tire, and then divides the result by the number of desired pitches. The pitch lengths are defined by the amplitude of the curve. The Applicant respectfully traverses the conclusion set forth in the Office Action that Sekula's selection of an audio spectrum discloses the "defining" steps of claim 1. The modulation order

characteristics of Sekula's generated spectrum are not known, never calculated, and are certainly not defined as required by claim 1. However, claim 1 requires the first and second modulation orders to be defined to be smaller or equal to the third modulation order. Such a limitation is not disclosed in the Sekula reference. The selection of an audio spectrum in Sekula does not necessarily define the modulation orders in this manner. The drawback with the Sekula method is explained in Applicant's specification on page 3 with reference to Figs. 1 and 2. A pitch sequence yielding a desirable harmonic response in the audio spectrum may have undesirable modulation. This problem is addressed in the inventor's earlier patent publication US 2003/0040886 (now US Patent 7,006,930) wherein a secondary screening technique is disclosed. Sekula's method of design a pitch sequence is focused on the audio spectrum without regard for the secondary modulation noise. Sekula's method may thus create a tire noise pitch sequence having undesirable modulation as discussed on page 3 of Applicant's specification. Sekula thus does not disclose, teach, or suggest the steps of selecting and defining the modulation orders as recited in claim 1.

The Applicant also respectfully traverses the conclusion in the Office Action that Sekula's inverse Fourier transformation discloses the steps of creating individual modulation order functions and summing the created functions. Sekula discloses that the fast Fourier transformation (12) only acts on an audio spectrum that has already been generated by the audio spectrum generator (11). Sekula's method does not contemplate using the fast Fourier

transformer to create and sum functions for the modulation orders as recited in claim 1.

The Applicant also respectfully traverses the conclusion set forth in the Office Action that Sekula defines the pitch sequence from the summation of the modulation order functions. Sekula teaches that the pitches are defined by an adjusted result of the inverse fast Fourier transformation of the audio spectrum. Defining a pitch sequence directly from the audio spectrum without regard to the modulation orders can yield undesirable results as noted above. Sekula thus does not disclose, teach, or suggest the step of defining a pitch sequence from the summation of modulation order functions.

Given the significant differences between claim 1 and the Sekula reference, the addition of the Kogure teachings does not render the invention obvious under section 103. Kogure merely teaches that the modulation orders under ten should be studied. Kogure concludes that varying the periods results in a dispersion of the pulsation. Kogure thus does not select a number of modulation orders, does not define the orders with functions, and does not sum the functions. Kogure merely teaches that an analysis of the modulation orders is needed. This teaching, however, is acknowledged as prior art in Applicant's specification (page 8, line 4). Kogure thus discloses something that the Applicant already recognizes in its application. Kogure's use of this information leads in a different direction from that of the claimed invention. Kogure's solution to the pulsation problem is substantially different than Applicant's claimed invention. The combination of the Kogure teachings with the Sekula method would have led

those of ordinary skill in the art to vary the fundamental periods of the sequence generated by the Sekula method (see Kogure, Col. 3, lines 30-45). Kogure thus teaches away from the claimed method and the combination of Kogure with Sekula does not yield the claimed invention.

The Stuckey reference cited as a tertiary reference against some of the dependent claims discloses a secondary screening technique to compare pitch sequences designed under other prior art design methodologies. The addition of the Stuckey teachings to the combination of Kogure and Sekula leads of ordinary skill in the art to compare different pitch sequences generated by the Kogure/Sekula teachings to determine which is better. The pitch sequences designed and compared by this combination would still be based on Sekula's audio spectrum combined with the period shifts of Kogure. The combined teachings of all three references does not render the method of claim 1 obvious. The Applicant thus respectfully requests the rejections of claims 1-14 to be withdrawn.

Claims 15-18

The Office Action rejects claims 15-17 as being obvious in view of Sekula combined with Stuckey. Claims 18 and 23-24 have been rejected as being obvious in view of the Sekula/Stuckey combination in further view of Kogure. The Applicant respectfully traverses the rejections. As explained above, Sekula discloses a method for designing a pitch sequence from a desirable audio frequency spectrum while Stuckey discloses a secondary screening technique for analyzing the differences between competing pitch sequences such as those designed by Sekula. Claim 15 requires the design process to first define characteristics of tire noise attributed to the lug stiffness variations and then define the tire noise pitch sequence that yields the defined characteristics. Claim 15 thus has a completely different starting point for the pitch sequence design than the Sekula reference. Stuckey does not provide motivation for changing the starting point of the Sekula design methodology to that recited in claim 15. Stuckey leads one of ordinary skill in the art to avoid undesirable results by testing a plurality of Sekula pitch sequences and selecting the one with the best results. Stuckey does not contain motivation for altering the design methodology of Sekula to achieve the invention of claims 15-17. The addition of the Kogure teachings does not change the result.

Claims 21-22

The Office Action rejects claims 21-22 as being obvious in view of the combination of Sekula, Kogure, and Stuckey. The Applicant respectfully

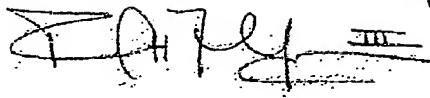
traverses the rejections. The content of these prior art references is noted above. The Applicant maintains, as above, that the combination of these references does not render the claimed invention obvious. The claimed invention requires the modulation orders to be selected, defined, and summed. A lug stiffness variation curve is then equated to the summation of the modulation order curves. This equation is then solved to determine the pitch sizes for the pitch sequence. The prior art combination cited in the office action disclosed a methodology that defines the pitches from an audio frequency spectrum (Sekula) and then alters the periods of the pitch sequence (Kogure) to vary the tire noise. The addition of the Stuckey reference teaches that different sequences may then be compared to select a more desirable sequence. Nothing in the combination of references motivates one of ordinary skill in the art to change the methodology of Sekula by abandoning the audio frequency spectrum in favor of defined modulation characteristics as required in claim 21. The Applicant thus submits claim 21 and its dependent claim are patentable over the cited art.

In view of the foregoing, the Applicant respectfully requests consideration of the claims and most earnestly solicits the issuance of a formal Notice of Allowance for the claims.

Please call the undersigned attorney if any issues remain after this amendment.

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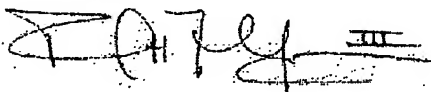
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